## Remarks

For the reasons stated herein, Applicants respectfully submit that all claims are in condition for allowance. However, if after reviewing this paper, the Examiner remains unconvinced, Applicants' undersigned representative requests that the Examiner schedule a telephone interview with Applicants' representative to further discuss the rejections stated in the Office Action and the issues raised hereinbelow with respect thereto.

In the Office Action, claims 1-3, 6-11, 14-19 & 22-24 were rejected under 35 U.S.C. §102(b) as being anticipated by Iwasaki et al. (U.S. Patent No. 5,274,809; hereinafter Iwasaki), while claims 4-5, 12-13 & 20-21 were rejected under 35 U.S.C. §103(a) as being unpatentable over Iwasaki in view of Murphy et al. (U.S. Patent No. 5,077,677; hereinafter Murphy). These rejections are respectfully, but most strenuously, traversed and reconsideration thereof is requested.

Applicants' invention, in one aspect, is directed to a computer system which includes tasks potentially contending for a latch (see claim 1). *Each task includes:*

> a probability determining component *to dynamically estimate the probability that the task will successfully acquire the latch*; and
>
> a suspending component to place the task in a suspended state for a predefined sleep time *where the estimated probability is below a predetermined threshold value.*

It is well settled that there is no anticipation of a claim unless a single prior art reference discloses: (1) all the same elements of the claimed invention; (2) found in the same situation as the claimed invention; (3) united in the same way as the claimed invention; and (4) in order to perform the identical function as the claimed invention. In this instance, Iwasaki fails to disclose all the same elements, performing the identical function, as Applicants' invention recited in the independent claims 1, 9 & 17, as well as the invention recited in various dependent claims, and as a result, does not anticipate (or even render obvious) Applicants' invention.

In the Office Action, it is asserted that Applicants' *probability determining component within each task* is taught by Iwasaki at column 3, lines 1-15, as well as column 16, lines 26-36.

Column 3, lines 1-15 of Iwasaki state:

> The foregoing two lock management systems, i.e., spin lock mechanism and wait/post mechanism, involve a problem in that the number of dynamic steps expended for the execution of a task increases by the occurrence of lock contentions among tasks. Namely, a multiprocessor system has an increased number of dynamic steps of execution per task as compared with task execution by a single processor. The reason for the increased number of dynamic steps resides in an increased overhead of spin procedure or wait/post procedure due to lock contentions and an increased overhead of dispatch procedure attributable to the increase in wait/post procedures.

Applicants respectfully submit that a careful reading of this paragraph fails to uncover any relevancy to the particular probability determining component at issue. To the extent relevant to Applicants' invention, the paragraph merely indicates that lock contention among tasks may occur.

Column 16, lines 26-26 are also cited in the Office Action for Applicants' particular probability determining component within each task. To understand these lines in context, Applicants herein repeat column 15, line 66 – column 16, line 36:

> (b) This mechanism is capable of minimizing the resource lock period, and is therefore advantageous in preventing a degraded throughput caused by lock contentions. However, before a post receive task locks a shared resource, it can be locked by another task, resulting possibly in a recursive lock failure. This causes the same task to have an iteration of retry, and the system response can be deteriorated to some extent. This problem is overcome by this embodiment as follows.
>
> In case the same task fails to lock a shared resource as a result of iterative retries, the task is allowed to lock the resource without the release of the resource, and the task (post receive task) is brought to ready, as in the convention mechanism (steps 113, 115 and 116 in FIG. 1A). Specifically, *the number of retries attempted by the post receive task is counted*: (step 1623 in FIG. 2), and if the number is below the upper limit value, the shared resource becomes available and the post procedure is initiated at the execution of unlock procedure: (steps 183, 184 and 185 in FIG. 3). If the number of retries reaches or is beyond the upper limit, the post procedure is initiated without releasing the share resource (step 186 in FIG. 3), as in the conventional mechanism. Namely, if a post receive task fails to lock a share resource after repeated requests, or when a specific

> resource is used, the post receive task is allowed to lock the share resource without release. (emphasis added)
>
> For a lock fail rate (the probability of failure in lock attempts) of $\beta$ and a *retry upper limit value of N*, the probability of N-time recursive lock failures is $\beta^N$. Since $\beta$ ranges between 0 and 1 ($0 < \beta < 1$), the value of $\beta^N$ is sufficiently small. Accordingly, it become possible to minimize the probability ($\beta^N$) of resource lock over the period after commencement of post procedure until the reentry of the task 2 in the running state following its retries over the upper limit value, and at the same time to maintain the number of retries by the task 2 N times or lower. (emphasis added)

Thus, in accordance with Iwasaki's teaching, if the same task fails to lock a shared resource as a result of iterative retries, the task is allowed to lock the resource without the release of the resource. Specifically, the number (N) of retries attempted by the post received task is counted, and if the number is below an upper limit value, the shared resource becomes available and the post procedure is initiated at the execution of the unlock procedure. If the number of retries reaches or is beyond the upper limit, the post procedure is initiated without releasing the shared resource. Iwasaki at column 16, lines 25-36, then explain the theory behind this process.

This theoretical explanation of why the process outlined at column 16, lines 7-24 is acceptable is simply not relevant to Applicants' recited probability determining component within the task *to dynamically estimate the probability that the task will successfully acquire the latch*. There is no dynamic estimation of probability that the task will successfully acquire the latch in Iwasaki, nor is there any employing of such a probability in taking an action. Column 16, lines 25-36 of Iwasaki explain that using Iwasaki's approach outlined at column 16, line 7-25, resource starvation will not occur. In Iwasaki, there is a limit on the number of times that a task can fail to acquire a lock. Once that limit is reached, the task is guaranteed to receive the lock on the $N^{th} + 1$ time. There is simply no teaching or suggestion in Iwasaki of evaluating dynamically the probability of successfully acquiring a latch, as recited in Applicants' invention.

Further, although the theoretical explanation at column 16, lines 25-36 of Iwasaki considers the "probability of failure in lock attempts", there is no teaching or suggestion in this paragraph of a probability determining component being used to *dynamically estimate* probability of successfully acquiring the latch. The only commonality in these lines of Iwasaki and Applicants' recited functionality is the word "probability". However, in Iwasaki, the

probability at issue and the discussion cited is simply a different concept, and is not relevant to the function recited by Applicants.

For at least the above-noted reasons, Applicants respectfully request reconsideration and withdrawal of the anticipation rejection to the independent claims presented based upon the teachings of Iwasaki. In Applicants' approach, the task itself has a probability determining component which dynamically estimates the probability that the task will successfully acquire the latch. A careful reading of Iwasaki fails to disclose any teaching or suggestion of such a facility.

Further, Applicants recite that each task includes a suspending component which places a task in a suspended state for a defined sleep time *where the estimated probability is below a predetermined threshold value*. In connection with this component, the Office Action again cites the above-noted lines at columns 3 & 16, as well as column 2, lines 15-27 & column 5, lines 45-60. These additional lines of Iwasaki simply describe suspending a task or placing a task in sleep mode. However, Iwasaki does not teach that the task includes a suspending component to place the task in a suspended state for a defined sleep time *where the estimated probability is below a predetermined threshold value*. As noted above, a careful reading of Iwasaki fails to uncover any teaching or suggestion of a probability determining component within the task *to dynamically estimate the probability that the task will successfully acquire the latch.* Without first achieving a dynamic estimate of the probability that the task will successfully acquire the latch, there can be no suspending component which places the task in a suspended state for a predefined sleep time *where the estimated probability is below a predetermined threshold value.*

The Office Action asserts "threshold is the point when the task is considered lock-failing from the lock fail rate probability data". Applicants respectfully submit that this characterization of the teachings of Iwasaki fails to address the particular language recited in the independent claims at issue. In Applicants' invention, there is a *dynamic estimate of the probability that the task will successfully acquire the latch.* No such dynamic estimate of probability of acquiring a latch is provided in Iwasaki. Iwasaki merely discusses at column 16, lines 26-36, the theory behind providing an upper limit value of N retries before guaranteeing that a task acquires a lock. Again, N is the number of retries by the task to acquire the lock. This is clearly a different

process than that recited in Applicants' independent claims. The determination of probability of failure in lock attempts of $\beta$ at column 16 in Iwasaki is merely explaining the theory behind the particular approach outlined at column 16, lines 7-24 thereof. As such, there is no "dynamic estimate" of the probability that the task will successfully acquire the latch by a probability determining component of the task.

Applicants recognize that the art does describe suspending a task for different reasons. However, there is no discussion in Iwasaki, or the other known art, of providing a task with a probability determining component *to dynamically estimate the probability that the task will successfully acquire the latch,* and a suspending component to place the task in a suspended state for a defined sleep time *where the estimated probability is below a predetermined threshold value*. A careful reading of Iwasaki fails to uncover any action being taken based on a dynamic estimation of the probability that the task will successfully acquire the latch. As such, Applicants respectfully submits that the Office Action misinterprets the teachings of Iwasaki in applying those teachings to their recited invention.

For at least the above-noted additional reasons, reconsideration and withdrawal of the anticipation rejection to the independent claims presented is respectfully requested.

The dependent claims are believed allowable for the same reasons as the independent claims, as well as for their own additional characterizations.

With respect to the obviousness rejection of claims 4-5, 12-13 & 20-21, Applicants note that Murphy is not being cited in the Office Action for any of the above-noted deficiencies of Iwasaki when applied against the independent claims presented. As such, these claims are believed allowable for the same reasons noted above with respect to the independent claims.

Further, the claims recite that the suspending component within each task adjusts the defined sleep time for the task *in accordance with changes in the estimated probability that the task will successfully acquire the latch.* The Office Action recognizes that this facility is not taught by Iwasaki, but then alleges that Murphy teaches an adaptive controller and a latch, wherein the idle stay is effected by a probability calculation. Column 17, lines 29-33 of Murphy are cited in support of this assertion. These lines state:

> The change of the multiplexer control from the last stage BMULTCTRL to the initial stage, AJCTRL, clocks the SEQON latch 360, thus changing the probability calculation to the idle state. The results reside in the output latches of the multiplier adder 280.

Although the cited lines of Murphy do describe changing a probability calculation to the idle state, this language does not teach or suggest the particular functionality at issue in Applicants' dependent claims. In particular, Applicants' dependent claims recite that the suspending component *adjusts the defined sleep time in accordance with changes in the estimated probability.* There is no discussion in the Office Action or in Murphy of adjusting the defined sleep time based on a change in the estimated probability. As such, Applicants respectfully submit that the Office Action fails to state a *prima facie* case of obviousness against these claims. Applicants therefore request reconsideration and withdrawal of the obviousness rejection.

To summarize, Applicants submit that the teachings of Iwasaki are distinct from those of Applicants' recited invention. In particular, Iwasaki is addressed to how to prevent a task from failing to lock a shared resource. The solution described therein is to allow the task N number of iterative retries, and once the number N is reached, i.e., the upper limit, then the task is allowed to lock the resource without the release of the resource. This process is clearly distinct from that recited in Applicants' independent claims. A careful reading of the theory described at column 16, lines 26-36 of Iwasaki does not teach or suggest the provision of a probability determining component to dynamically estimate the probability that the task will successfully acquire the latch, as recited in Applicants' independent claims. As such, all claims presented are believed to patentably distinguish over the teachings of Iwasaki, either alone, or in combination with Murphy.

For at least the above-noted reasons, Applicants respectfully request allowance of all claims.

If a telephone conference would be of assistance in advancing prosecution of the subject application, Applicants' undersigned attorney invites the Examiner to schedule a conference with him at the number provided.

Respectfully submitted,

Kevin P. Radigan

Kevin P. Radigan
Attorney for Applicants
Registration No.: 31,789

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HESLIN ROTHENBERG FARLEY & MESITI P.C.
5 Columbia Circle
Albany, New York 12203-5160
Telephone: (518) 452-5600
Facsimile: (518) 452-5579